REMARKS

The above-noted amendments are presented in response to the Office Action of November 13, 2003, wherefore reconsideration is requested.

Referring to the text of the Office Action:

a) claims 1, 3, 4, 8, 13, 15, 16, 20, 25, 27, 28, 32, 37, 40, 44 and 45 stand rejected under 35 U.S.C. § 102(b), as being unpatentable over the teaching of United States Patent No. 5,351,146 (Chan et al.);

b) claim 44 is further rejected under 35 U.S.C. § 102(e), as being unpatentable over the teaching of United States Patent No. 6,519,062 (Yoo);

c) claims 2, 14, 26 and 38 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over the teaching of United States Patent No. 5,351,146 (Chan et al.)

d) claims 44-49 stand rejected under 35 USC § 112, second paragraph as being indefinite; and

e) claims 5-7, 9-12, 17-19, 21-24, 29-31, 33-36, 39 and 41-43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims.

As an initial matter, applicant appreciates the Examiner's indication of allowable subject matter in claims 5-7, 9-12, 17-19, 21-24, 29-31, 33-36, 39 and 41-43. It is believed that the Examiner's objections to claims 44-49, and rejections of claims 1-4, 8, 13-16, 20, 25-28, 32, 37, 38, 40, 44 and 45 stand rejected under 35 U.S.C. § 102(b) are overcome by the above-noted claim amendments, and further in view of the comments below.

Rejection under 35 USC § 112

It is believed that the Examiner's rejection of claims 44-49 is overcome by the above-noted amendment of claim 44.

Rejections under 35 U.S.C. § 102(b)

In support of his rejection of claims 1, 3, 4, 8, 13, 15, 16, 20, 25, 27, 28, 32, 37, 40, 44 and 45 stand rejected under 35 U.S.C. § 102(b), the Examiner asserts that Chan et al discloses M data signals (110), m parallel data signals (112), means for processing respective composite data streams received over the N channels to recover the M parallel data signals (see FIGs. 5 and 6), means for dividing each composite data stream (1XN DEMUX), means for interleaving respective substream (see FIG. 6)" Applicant disagrees.

United States Patent No. 5,351,146 (Chan et al.) teaches an all-optical network architecture which employs a three level hierarchy using wavelength-division multiplexing. At the lowest level of the hierarchy are Level-0 all optical networks. The Level-0 networks are "local" broadcast networks each of which supports a plurality of access ports and each access port can hear all the local traffic transmitted by all other access ports in the same Level-0 network. Each Level-0 network shares wavelengths internally, but there is extensive reuse of wavelengths among different Level-0 networks. The next higher level, which is the intermediate level, Level-1, is essentially a wavelength router coupled with one or more of the Level-0 networks to provide a wavelength path to one or more directly connect Level-0 networks or, in combination with a Level-2 network, a light path to one or more Level-0 network outside itself. The Level-2 are second level wavelength routing networks which provide light paths, as opposed to wavelength paths, between Level-1 networks. The Level-2 networks may be as simple as fiber trunks alone or they may employ frequency changing devices in addition to wavelength routers and/or spatial switches. (see Abstract).

The architecture of Chan et al uses all-optical switches to control the routing of traffic through the network. As is well known in the art, particularly at the time of the Chan et al reference, all-optical switches are essentially "wavelength switches", in that a wavelength channel received through an input port (optical fiber) is routed to an output port. Two types of wavelength routers are known, static and dynamic. Thus:

> Referring to FIG. 5, there is illustrated a diagram of the operation of a static wavelength router. With an NXN static wavelength router, full connectivity is provided from each input port 110 to every output port 112. As received from an input port, the selection of an output port is made by the choice of wavelength used. Clearly, since multiple wavelengths may be used on each fiber, multiple simultaneous wavelength paths exist from each input fiber. (Col 10, lines 23-33)

And:

> The static wavelength router performs best when the traffic matrix is uniform. However, when the traffic matrix is non-uniform, then a dynamically reconfigurable device such as is illustrated in FIG. 6 can be used. The device of FIG. 6 is a generalization of the static wavelength router and allows more than one wavelength from each free spectral range to be routed to the same output through N.times.N spatial switches.
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> As is illustrated in FIG. 6, a dynamic wavelength router uses multiple $LiNbO_3$ spatial optical switches e.g., made of $LiNbO_3$ or IP switching elements. (Col 10, lines 53-68)

Based on the foregoing, the skilled artisan will immediately recognize that the routers of FIGs. 5 and 6 are conventional wavelength routers. The embodiment of FIG. 5 is a conventional static NXN router, in which N wavelength channels $F_m[1]$-$F_m[n]$ received through input ports 110 are routed into respective output ports 112. Thus in the specific example of FIG. 5, channel $F_1[1]$ is routed to output port 1; channel $F_1[2]$ is routed to output port 2; channel $F_1[3]$ is routed to output port 3, etc. Of course, the skilled artisan will immediately recognize that such channel routing is made on a per-wavelength basis. No time-division demultiplexing or routing takes place, because, as is very well known in the art, conventional wavelength routers are incapable of such functionality. The

embodiment of FIG. 6 is a conventional dynamic router, in which a respective 1XN DEMUX separates the N wavelength channels λ_1-λ_N received through each of M input ports 110. A respective MXM optical switch is used to route a channel from each input port to a selected output port. At each output port, the various outbound channels are combined by a conventional NX1 MUX for transmission through the output port.

Thus the skilled artisan will immediately recognize that Chan et al does not in any way support the Examiner's characterization. In particular:

- Chan et al do not teach or suggest the Examiner's "M data signals (110)" or "m parallel data signals (112)" Elements 110 and 112 refer to input and output ports, respectively, of an all-optical switch. Each port is connected to an optical fiber carrying (n) wavelength channels.

- Chan et al do not teach or suggest the Examiner's "means for processing respective composite data streams received over the N channels to recover the M parallel data signals (see FIGs. 5 and 6)". Chan et al. clearly and unambiguously teach conventional static and dynamic wavelength switches for routing wavelength channels received through each of N input ports to selected ones of N output ports. Chan et al do not teach or suggest a "composite data stream", but rather an input port through which multiple parallel wavelength channels are received. For greater certainty, there is absolutely no similarity whatsoever between an optical fiber carrying multiple parallel wavelength channels, and a "composite data stream" as provided by the present invention.

- Chan et al do not teach or suggest the Examiner's "means for dividing each composite data stream". As mentioned above, there is absolutely no similarity whatsoever between the wavelength-division multiplexed (WDM)

channels of Chan et al. and the "composite data stream" of the present invention. The skilled artisan will immediately recognize that the conventional 1XN DEMUX identified by the Examiner is utterly incapable of dividing such a composite data stream, as suggested by the Examiner.

- Chan et al do not teach or suggest the Examiner's "means for interleaving respective substream (FIG. 6)" As described above, FIG. 6 of Chan et al. illustrates a conventional dynamic wavelength switch. It is well known in the art that such a switch is utterly incapable of "interleavings" anything, much less "respective substream[s]" as suggested by the Examiner.

Furthermore, and in light of the foregoing, the skilled artisan will immediately recognize that Chan et al does not teach ANY of the elements of the presently claimed invention. For Example, with reference to claim 1:

- Chan et. al do not teach or suggest methods or systems for equalization. In this respect, Chan et al cannot be considered to be even remotely relevant art.

- Chan et al do not teach or suggest "distributing each one of M ... data signals across N channels..., such that a substantially equal proportion of each data signal is conveyed through each one of the N channels..." as defined in the claim. Chan et al routes N channels between input and output ports, which is very obviously an entirely unrelated function.

- Chan et al do not teach or suggest "processing the composite data stream conveyed through the N channels to recover the M data signals" as defined in the claim. Not only do Chan et al not teach any such function, but Chan et al do not teach or suggest any elements that are even remotely capable of providing such function.

In light of the foregoing, it is respectfully submitted that the Chan et al reference cannot teach the elements of the present invention, and cannot support a rejection of claims under 35 U.S.C. § 102(b).

Similar arguments to those presented above apply in respect of United States Patent No. 6,519,062 (Yoo), which provides "an ultra-low latency optical router" (see abstract). As with any optical router, Yoo provides methods and systems for routing optical wavelength channels between input and output ports. WDM channels (e.g. λ_1^1, λ_2^1, λ_3^1, λ_4^1, etc) can be conveyed within a single waveguide, and independently routed (again, on a per-wavelength basis), through the system. However it is self-evident that Yoo does not teach ANY of the elements of the presently claimed invention. For Example, with reference to claim 1:

- Yoo does not teach or suggest methods or systems for equalization. In this respect, the Yoo patent cannot be considered to be even remotely relevant prior art.

- Yoo does not teach or suggest "distributing each one of M ... data signals across N channels..., such that a substantially equal proportion of each data signal is conveyed through each one of the N channels..." as defined in the claim. Yoo routes multiple wavelength channels between input and output ports, which is very obviously an entirely unrelated function.

- Yoo does not teach or suggest "processing the composite data stream conveyed through the N channels to recover the M data signals" as defined in the claim. Not only does Yoo not teach any such function, but Yoo does not teach or suggest any elements that are even remotely capable of providing such function.

In light of the foregoing, it is respectfully submitted that the Yoo reference does not teach the elements of the present invention, and thus cannot support a rejection of claims under 35 U.S.C. § 102(b).

Rejections under 35 U.S.C. § 103(a)

As discussed in detail above, Chan et al do not teach for suggest any of the elements of the present invention, as defined in the independent claims. Accordingly, Chan et al cannot support a rejection of any dependent claim under 35 U.S.C. § 103(a). Accordingly, claims 2,14, 26 and 38 are believed to be patentable over Chan et al.

In light of the foregoing, it is believed that the present application is in condition for allowance, and early action in that respect is courteously solicited.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,

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